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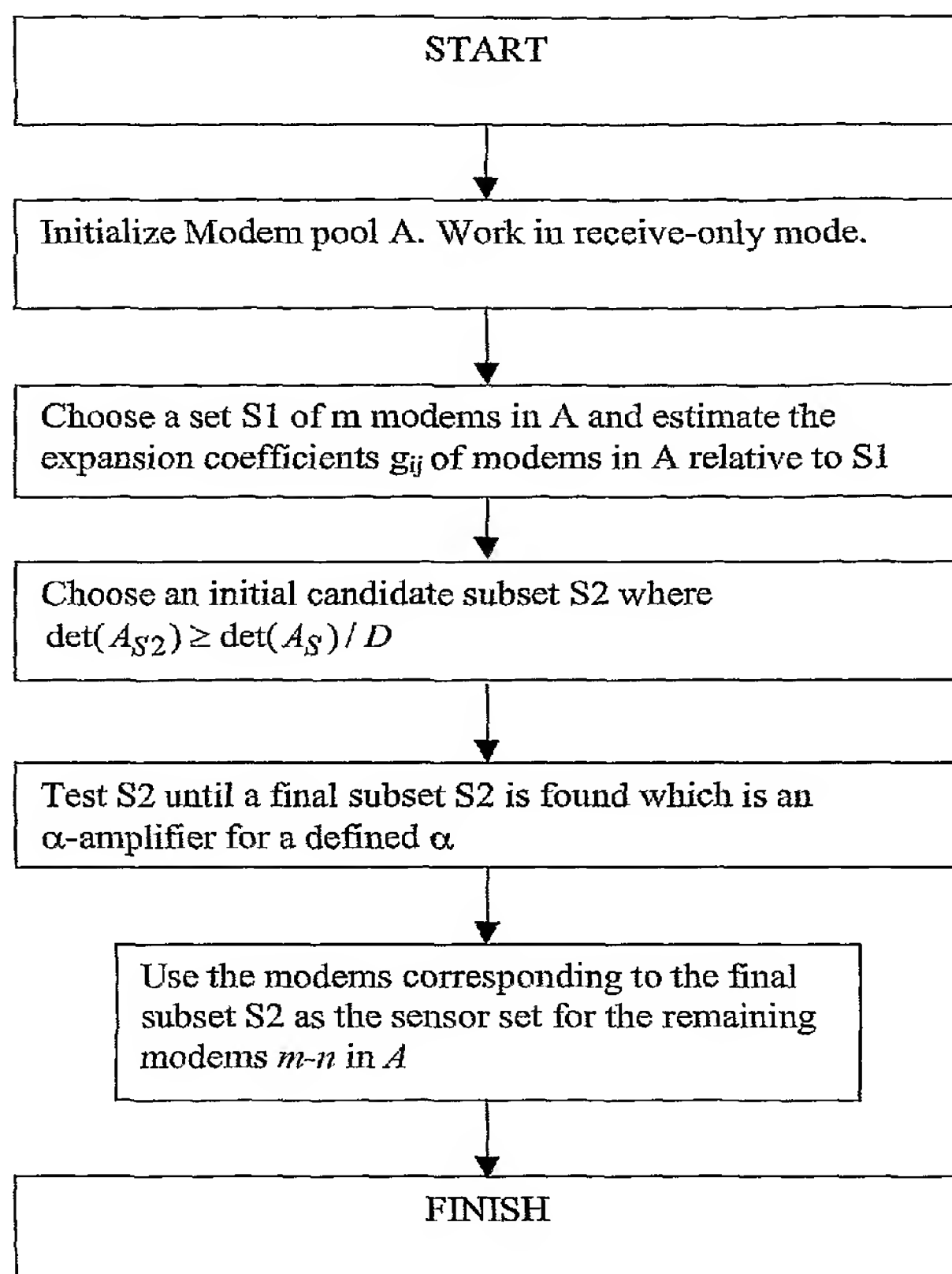
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(54) Title: LINE SENSOR SELECTION FOR QUANTIFYING ALIEN CROSSTALK IN A SHARED COMMUNICATIONS MEDIUM



(57) Abstract: In a communication medium including a first set  $A$  of  $n$  communication channels and a second set  $U$  of  $m$  communication channels, a method for selecting sensor channels in  $A$  for quantifying crosstalk from  $U$ , including operating  $A$  in a receive-only mode (Fig.2 Step of Initialize Modem pool A. Work in receive-only mode.), choosing a subset  $S_1$  of  $A$ , estimating the expansion coefficients of  $A$  as a predefined function of subset  $S_1$  and signals received by  $A$  (Fig.2 Step of Choose a set  $S_1$  of  $m$  modems in  $A$  and estimate the expansion coefficients  $g_{ij}$  of modems in  $A$  relative to  $S_1$ ), choosing a candidate subset  $S_2$  of size  $m$  of  $A$  where the determinant of a matrix of the expansion coefficients corresponding to the subset  $S_2$  is greater than that of the expansion coefficients corresponding to any other subset of size  $m$  of  $A$  divided by a predefined bound  $D$  (Fig.2 Step of Choose an initial candidate subset  $S_2$  where  $\det(A_{S_2}) \geq \det(A_S)/D$ ), calculating a threshold  $\alpha$ , choosing a final subset  $S_2$  that is an  $\alpha$ -amplifier (Fig.2 Step of Test  $S_2$  until a final subset  $S_2$  is found which is an  $\alpha$ -amplifier for a defined  $\alpha$ ), and employing the communications channels in the final subset  $S_2$  as sensor channels (Fig.2 Step of Use the modems corresponding to the final subset  $S_2$  as the sensor set for the remaining modems  $m-n$  in  $A$ ) for quantifying crosstalk from  $U$ .

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